SOIL conservation

U. S. Department of Agriculture
Soil Conservation Service
December 1974

From the Administrator

The Public is Concerned

If we needed any additional evidence of the growing public interest in soil conservation, we got it last fall in North Carolina.

For the first time in the Tarheel State, supervisors of soil and water conservation districts went on the ballot of the November general election. Prior to that, supervisors had been chosen in special rural elections which attracted little public notice.

What was interesting about these district races was the amount of excitement that they generated in the local press and among local conservation groups. In most of North Carolina's 92 districts, there was no shortage of candidates. There also was no shortage of articles and newscasts, despite competition for space and time from other election campaigns.

Commenting on the district elections, in an editorial, *The Asheville Times* observed that "soil erosion is no longer seen as only a rural problem. Sedimentation control and other conservation programs related to land use are of countywide concern."

And an editorial in the *Greensboro Record* noted: "Ecological concerns are more popular than ever before. People are coming to understand that erosion is an urban problem too . . . How the land and water are used and conserved are matters of central importance today."

Such comments should serve to remind all of us that there is an American public interested in soil conservation, concerned with soil conservation, and ready to act on soil conservation. Yet paper after paper in North Carolina referred to the board of supervisors as "obscure," to the programs as "little known," and to the work as performed "largely out of public view." We all know that this view of soil and water conservation is not confined to North Carolina; our program still lacks visibility in many, many states. In the jargon of the city public relations practitioner, we tend to have a "low profile."

The comments resulting from the North Carolina campaigns suggest that we may be shortchanging our program—and the general public—by not talking more about problems of soil and water conservation, and how they affect people all over the country.

During the past year, we made a new beginning. Local districts focused on local "Show and Tell" programs to improve their image and joined with SCS in a nationwide "produce more, protect more" campaign that is continuing into 1975. Let's build on that beginning, and, taking heart from the North Carolina experience, make sure that the American people, both urban and rural, understand that soil conservation is everybody's business.

Kenneth E. Grant

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COVER: Organic soils in Florida help make that state a leading producer of winter vegetables and also require such conservation measures as flooding during the off season to reduce oxidation. The leading domestic producer of winter cabbage, Florida boasts this field on organic soils near Lake Okeechobee.

December 1974, Vol. 40, No. 5

Soil Conservation is the official magazine of the Soil Conservation Service, published monthly by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. Use of funds for printing this publication approved by the Director of the Office of Management and Budget, July 17, 1973.

Earl L. Butz
Secretary of Agriculture

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Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Subscriptions

$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from Superintendent of Documents, Government Printing Office, Washington, D.C. 20402

The flooding of an $8 million shopping mall twice before it was a year old focused attention on problems of growth on a "filled" flood plain in Raleigh, North Carolina. County officials then developed a plan to regulate upstream development in the county to keep runoff within the capacity of the stream channel and flood retarding structures for Crabtree Creek.

Planning for the Land's Sake

by John G. Scott and Robert M. Kirby
Director of Planning, Wake County Planning Department, and soil scientist, SCS (on IPA assignment), Wake County Planning Department, Wake County, North Carolina

During the 1960's, the population of Wake County, North Carolina, rose by more than a third. Personal income rose at one of the highest rates in the Southeast.

A building boom occurred, and with it came urban sprawl and the inevitable associated problems.

Then, a situation occurred that brought into focus a problem that had been building up for years. In February and again in June of 1973 the new Crabtree Mall in Raleigh was flooded. An $8 million shopping center, Crabtree Mall is situated on a "filled" flood plain of Crabtree Creek. It opened in the late summer of 1972.

Flood losses totaled millions of dollars. Earlier flooding of the lowlands along Crabtree Creek had been a nuisance, but had failed to dramatize the conditions in such a vivid way. If urban expansion occurred in the upper reaches of the watershed, it was evident that more floods and greater losses were ahead.

The June 1973 storm was a 15-year storm, meaning such a storm can be expected once in about 15 years. This storm had put about a foot of water on the floor of the shopping mall on the flood plain. Damage was considerably worse farther downstream. It was apparent that a 50- or 100-year frequency flood would be catastrophic.

The lower half of Crabtree Creek, which drains the 91,000-acre watershed, flows through Raleigh. The flood plains within the city are fairly large, and although they have a history of flooding, development has occurred due to the irresistible attractions of flat terrain, nearness to major transportation arteries, and in-town sites. Increased urbanization in the watershed, however, would increase runoff and flooding.

Recognizing the potential susceptibility to flooding, local officials took steps to alleviate the problem.

Prior to the 1973 flooding, the county had started implementing a small watershed program with Public Law 566 assistance from the Soil Conservation Service. A soil survey of the county was published in 1972. The county planning department also requested the full-time assistance of a soil scientist from SCS.*

As a result of the combined efforts of planners, engineers, and soil scientists, the county commissioners delayed extending utilities to the upstream parts of the watershed.

The Wake County Planning Department, with the aid of SCS personnel, then started a study to determine the consequences of development in the upper parts of the watershed. Included was a calculation of the increases in runoff caused by increased impervious surfaces such as roofs, roads, and parking lots. The maximum acceptable runoff was determined by the downstream capacity of the channel or structure.

*The soil scientist supplies technical assistance in the implementation of the North Carolina Sediment Control Act and Wake County Flood Ordinance in addition to work with the Wake County comprehensive plan.

The objective of the study was to modify zoning regulations to limit the amount of impervious surfaces. To gain additional areas of impervious surfaces, developers would have to put in retarding structures.

Public officials who plan and regulate land uses must consider the need to protect the public health, safety, and welfare, on one hand, and the need to permit reasonable and equitable private uses of land, on the other. The study of Crabtree Creek Watershed, using the methods described below, offers a new objectivity and legally defensible planning criteria to meet these needs.

The published soil survey of Wake County was used to place the soils in 12 urban suitability groups.

Each soil group was assigned a color to identify it on a map. The soil maps were measured to determine the acreage of each group within a drainage area. The color patterns on the soil maps give a visual image to assist planning the extension of water and sewer facilities to areas that have suitable soils for urban development.

Soils within a group have similar behavior characteristics for many urban uses. Runoff curve numbers for hydrologic soil cover complexes as used by SCS are similar for each group. Assuming that land use is similar, these curve numbers are used in estimating runoff volumes and peak flow rates for the areas under present land use conditions and after urban development.

The retarding structures in the watershed, when completed, will control the runoff in their respective drainage areas expected from a 100-year frequency storm. Storage of sediment is also included in the design of each structure.

Floodwaters of Crabtree Creek put about a foot of water on the floor of the newly opened Crabtree Mall shopping center in northwest Raleigh in June 1973.

Hydrologic conditions change as the amount of impervious surface increases. About 98 percent of the storm water falling on impervious surfaces will flow rapidly into the floodways. Where slopes are significant, this runoff will cause flow peaks that exceed flows of comparable rural areas. In the Raleigh area, urban developments have impervious surfaces that cover about 30 percent of the land. Other land cover consists of grass, lawns, shrubs, shade trees, and some farmland with forests.

Where land use and cover are similar for two soil suitability groups, as an example, and one has soil characteristics that retard runoff while the other does not, the county would permit more impervious cover on that group where soil characteristics retard runoff.

Planners must direct the development in a watershed so that runoff will not exceed the designed capacity of the flood retarding structures or the capacity of the stream channel.

Therefore, it is important that the impervious areas of the watershed be carefully regulated. In drainage areas where flood retarding structures are built or planned, the known capacity of the structure should determine the total permissible impervious surface of the drainage area.

This impervious surface can then be apportioned to land owners and developers. If a developer seeks to construct large areas of parking lots, roads, and other impervious areas which would generate greater runoff than that allocated for his development area, supplementary flood control measures must be constructed. These must have the capacity to control the excess runoff caused by his development work.

This approach to land use planning will be expanded to other parts of Wake County where urban development may create serious flood hazards in the future. In drainage areas where flood retarding structures are not planned, the capacity of the floodway to transmit the runoff will be used to compute permissible impervious area of the watershed. ♦

Boy Scouts Break Ground

Beachgrass Takes Hold on Canal Spoil

by David A. Nash
District conservationist, SCS, New Castle, Delaware

On a cold breezy morning one February, 30 Boy Scouts broke frozen ground to plant 'Cape' American beachgrass along the Chesapeake and Delaware Canal.

Their task: to put 25,000 plants on a test plot of 1 acre of heretofore sterile spoil. If successful, the plantings would stabilize steep slopes and fields of dredged sand and help keep sediment out of the canal. The canal, a manmade ship channel, connects the Chesapeake and Delaware Bays.

Miles of precarious embankment along the canal had been successfully vegetated by agronomists of the University of Delaware and the Soil Conservation Service, but this particular acre is 1 of 1,200 acres of spoil which had presented persistent problems. Dug from extreme depths of 50 to 100 feet or more in the channel, the spoil had soil conditions so varied that from spot to spot the texture could range from loamy sand to silty clay loam and the soil acidity from a pH of 2.5 to 6.5.

SCS's plant materials center in Cape May Court House, New Jersey, had furnished the plants for the Scouts. Chuck Mowry, SCS plant materials specialist, had suggested 'Cape' American beachgrass since nothing else had survived in trial plots on the site.

The Boy Scouts, led by Scoutmaster Richard Robinson, planted the beachgrass 18 inches apart, using three plants per spot, in staggered rows for maximum erosion control.

The author inspects the first year's growth of 'Cape' American beachgrass on a spoil flat by the Chesapeake and Delaware Canal.

Beachgrass is well adapted for stabilizing sand dunes along the shore, but the question was whether it could survive the harsh conditions of the spoil banks. In addition to the variations in soil, high winds continually blow across the top of the disposal areas.

'Cape' American beachgrass is a variety of beachgrass released in 1972 jointly by the SCS's plant materials center in New Jersey and by Rutgers University for stabilizing and building sand dunes. (See SOIL CONSERVATION, September 1974).

Over a period of a year, the grass planted by the Scouts did little but trap some blowing sand. Then last spring, the brown plants that appeared to be decaying sprouted green shoots. Within a month later, 35 percent of the plantings seemed healthy and were producing new plants by lateral runners.

The test plot—which had remained virtual desertland for 12 years despite numerous attempts to vegetate it—now has rapidly spreading beachgrass that forms a good ground cover.

The Scouts will tell you that it was their hand labor that made the difference. ♦

Fare for the Fishermen

Trout start jumping when Jeff Bowers scoops feed into the raceways on his father's farm.

by George R. Ways
Soil conservationist, SCS, Franklin, West Virginia

A coon hound usually trees raccoons. In West Virginia there is one that also catches trout, helping herself from the fish-and-pay trout ponds at Rainbow Farm.

Like any other commercial farmer, owner William H. Bowers works for a profit, but he doesn't worry about losses from the occasional visits of the fish-catching hound. It adds to his enjoyment of the unusual, and at Rainbow Farm, the unusual is normal.

Other nonpaying guests to the ponds include osprey, herons, and mink that await their chance to slip in for a helping of fish.

Two half-acre ponds provide the public a place to fish for rainbow and brook trout. The serene rural setting at Sugar Grove in West Virginia's Eastern Panhandle attracted about 1,000 people for weekend fishing in 1974 from April through July.

"I built the ponds in 1957 for my family's recreation," Bowers said. "Because everyone else wanted to fish there, I opened them to the public for fee fishing in 1964."

Bowers went to the Potomac Valley Soil Conservation District for technical help from the Soil Conservation Service in the survey, design, and construction of the ponds. His spring-fed stream was dammed to create the clear, cool trout ponds.

Working with the district on his ponds and on other conservation practices on his farm, Bowers became interested in soil and water conservation programs and was elected a district supervisor from Pendle-

ton County in 1970. He now aids the district and the Soil Conservation Service in helping others practice good land use management.

As a district supervisor, Bowers has helped secure land rights for construction of flood-prevention dams in the South Fork Watershed Project. The district is cosponsoring the upstream watershed project with the Pendleton County Court. Twenty-one of the planned 24 dams have been built and another is under construction. Bowers' 1,300-acre farm is in the upper reaches of the watershed.

In addition to his trout enterprise, Bowers had 70 sheep, 50 Angus beef cows, and 30,000 turkeys in 1974 and made 40 acres of hay. "Believe me, this really keeps you busy," he said.

Bowers continues to experiment with the capabilities of the soil and water on his farm. He planted 2 acres in buckwheat for wildlife food in 1974 and made a field trial planting of sericea lespedeza for summer pasture. He also raises channel catfish in warm-water ponds on Rainbow Farm.

For his fee-fishing ponds, Bowers buys about 12,000 fingerling trout yearly from hatcheries and feeds them on commercial trout chow for 2 years. The fingerlings live in five raceways Bowers designed until they are 12 to 15 inches long. Then they are stocked in the ponds. The raceways are 12 feet wide, total 300 feet long, and have a continuous waterflow.

Fishermen pay 11 cents an inch for fish between 10 and 20 inches long. Any fish caught less than 10 inches long or more than 20 inches is free. "Each year I put a number of these in the ponds. It's good business," Bowers said. ♦

Road Washout? Dam It!

by Dwight Snead and Robert L. Harryman
District conservationist, Unionville, Missouri,
and Green Hills RC&D project coordinator, Bethany, Missouri

Landowners in Putnam County, Missouri, aren't alarmed when water starts lapping at the edge of their roads. They planned it that way by building roadbeds that also serve as dams.

Combining a road and water-impounding dam into one structure isn't a new idea, but

Gully erosion that undercuts roads can sometimes be controlled by dams.

it is one many township boards and county courts have been hesitant to use.

Conservation-minded landowners in western Putnam County are among the state's leaders in terms of the number of road-dams (technically known as stabilization structures) built.

Since 1970 when the first road-dam was built by Hershel Cooley, 11 more have been constructed, most of them in York Township. Cooley needed a dam to stabilize a gully above the road and one below to store water for livestock. Here, the township furnished the pipe and the landowner did the earthwork. The road-dam saved the landowner valuable land and the cost of a second dam as well as improving the road.

At the Wilburn Collins farm, a 48-inch culvert was replaced with a road-dam. By building up the road and impounding a quarter acre of water, Collins was able to stabilize a gully and also to reduce the size of the pipe to 8 inches.

At another farm, two 36-inch culverts were replaced with one road-dam and one 18-inch pipe.

And at the Trulan Dunkin farm, where a 48-inch corrugated pipe washed out nearly every year, a road-dam was built in 1971 that required only an 18-inch smooth steel pipe.

"Even with all the rain we had in 1973, the road-dam worked perfectly," commented Jim Boland, York Township official.

Getting a road-dam takes the cooperation of the landowner, the township board, the county court, the soil and water conservation district, and the Soil Conservation Service. Usually the landowner provides the site for the borrow and the pool, the township pays for the earth work, and the county court pays for the pipe. SCS surveys, designs, and supervises the construction.

"Not all sites are suitable for road-dams," Bill Riggs, SCS engineer in Bethany, Missouri, points out. "Some may be too flat or may not have a suitable pool area, while others may have too much drainage area.

"The best sites have a deep, flat valley between two hills, allowing the maximum storage with a small fill. Even if the site meets these requirements, it may be dropped because of water lines, power lines, or buried cables that prevent digging.

"Where they are practical, road-dams work well. They don't have the problems that culverts have with trash or silt plugging the inlet. The pipe can be made to flow full of water; therefore, smaller pipes can normally be used." ♦

This dam northwest of Unionville, Missouri, corrects a washout problem and also provides water for livestock and wildlife.

'Banking' on a Conservation Plan

by Frank Jeter, Jr.
Public information officer, SCS, Raleigh, North Carolina

A new office complex south of Wilkesboro, North Carolina, looks as if it were built on an attractive hilltop.

But only a few years ago, a good part of the 50-acre site was affected by erosion. Sediment from steep slopes flowed into nearby streams, and big gullies traversed large portions of the land.

The Northwestern Bank, fifth largest in North Carolina, purchased the site in 1972 for an office complex—and found that quite a few problems came with it.

The land had been bulldozed and large areas had no vegetation. The idle land had received little care to control surface water. Rainfall had gouged gullies across the uneven, hilly terrain. A nearby mountain stream ran red with mud during frequent rains.

Erosion resulting in heavy silt deposits such as in this watercourse was among the problems Northwestern Bank brought under control through conservation measures.

Checking out some of the conservation measures taken are Gray Ashburn of the Northwestern Bank and John Nelson, district conservationist for SCS. The heavily grassed hilltop and asphalt waterway help control erosion.

This condition did not last long. George B. Collins, president of the Northwestern Bank of North Wilkesboro, which was building the office complex, is an enthusiastic conservationist who has served as a district supervisor with the Wilkes Soil and Water Conservation District and as president of the North Carolina Association of Soil and Water Conservation Districts. Collins quickly made plans to make the gullied site a model of conservation.

The bank sought the help of the Wilkes Soil and Water Conservation District and the Soil Conservation Service (SCS). District Conservationist John Nelson of SCS prepared a complete conservation plan for the tract, aided by Remer Dekle, an SCS civil engineer.

The plan included diversions to control runoff, drop inlets to control water moving from high to low ground, sloping of vertical banks to reduce steepness, and establishment of grass and other ground cover to prevent water and wind erosion. These steps would be augmented by planting of white pines on selected areas. Excess soil from sloping the steep banks would be used to form construction areas on lower levels.

"We hired a contractor immediately," said Gray Ashburn, agricultural representative of the bank and himself a soil and water conservation district supervisor.

"To accomplish the conservation goals, the contractor had to move more than a half-million cubic yards of earth. He also handled seeding and planting."

On some of the steep slopes, the contractor used a hydroseeder, a specialized device mounted on a truck to spray a mixture of seed, fertilizer, and lime on steep areas in one quick pass.

The results are spectacular. The area is planted, sloped, and controlled to provide a picture of conservation. The nearby stream runs clear. A large new office building, a plant shop, and an automobile service area have been completed, and another site is being developed for a second large office building.

In keeping with Northwestern Bank practice, enthusiastically promoted by Collins, landscaping is done no matter whether a new office has a large or small site. Shrubs are planted and grounds are well tended.

"We think it's a combination of good business and good sense," said Ashburn. ♦

Spreading Lespedeza—New Plant For Erosion Problems

by Harry J. Haynsworth
Plant materials specialist, SCS, Athens, Georgia

Spreading virgata lespedeza (**Lespedeza virgata**) is a new plant that is very effective in controlling erosion on highway roadbanks, road cuts, fills, and borrow areas.

Introduced into the United States in 1954 through the New Crops Branch of the Agricultural Research Service, this plant, native to Japan, was tested first at the Americus, Georgia, Plant Materials Center. These tests, by the Soil Conservation Service and the University of Georgia Agricultural Experiment Stations, started in 1957.

Later, Spreading lespedeza was tested extensively on Georgia highway roadbanks and then on problem sites in other southeastern states. It proved to be well adapted in the Upper Coastal Plain, Piedmont, and lower mountain elevations, and through most of

(continued on p. 15)

Joseph A. Carey (center), soil conservationist in Oglethorpe County, Georgia, looks at Spreading virgata lespedeza with visitors from Turkey.

A Nature Trail

by Andrew T. Stewart
Winter naturalist, Waterville Company, Inc., and district cooperator, Grafton County Conservation District, Enfield, New Hampshire

Witches' brooms, cradle knolls, goosefoot, rum cherry, and manna from heaven—all five are common sights for the thousands of ski tourers gliding through New Hampshire's forests every winter, but most ski right on by oblivious to these silent but eloquent members of the environment.

Our conviction that ski tourers could gain more satisfaction from their sport led, after a summer of exploration and work, to the following invitation engraved on a wood sign next to the Waterville Valley Ski Touring Center:

The Boulder Nature Trail
Ski through winter—Discover where you are
Your guide—the red signs and your five senses
Follow the track on the 1½ mile loop.

Skiers who accept the offer find a trail, long used for hiking, that is ideal for nature study. The variety of habitats includes open field that is actually an old downhill ski slope, northern hardwood uplands with occasional clearings, microclimates created by steep north facing slopes that support thick stands of fir and spruce, and a long stretch of the Mad River. There is even a short side trip to an active beaver pond.

Views of the White Mountains take on new meaning:

Glaciation
If you'd arrived 20,000 years sooner, you'd be under a mile of ice. You still can see how the glacier moved up the gradual north slope of Mt. Tecumseh opposite you but plucked many feet of rock from its steep south slope.

Throughout, the objective is to communicate on a personal and stimulating level with trail users of all ages. To be meaningful, the information has to go beyond Latin labels and statistics that rattle briefly in the mind like dry seeds in a gourd. Fortunately, we contacted the Grafton County Conservation District office in Woodsville, and Mike Dannehy, district conservationist for the Soil Conservation Service, put us in touch with Dave Allan, an SCS biologist operating out of Durham. Dave, who spent many hours going over the area with us, combines an intimate knowledge of the natural environment with a wealth of local lore and personal insight into the varied forms and stages of life along the trail:

A beaver lodge attracts ski t

River Erosion
Now you're on a flood plain created by the river after the glacier melted back. The swift, rock laden current contoured the bank. What

or Ski Tourers

as they cross a beaver pond.

differences do you see in tree growth? Climate and soil govern forest types.

Boulder Life

Years ago lichen started to break down this granite surface. Mosses took hold, forest litter rotted to build a bit of soil. Forty years ago the little spruce sprouted beside the yellow birch. Environment has limited its growth.

To complicate matters we had to remember that snow would be blanketing much of what we could see:

Cradle Knolls

You are passing through an area of hummocks or cradle knolls produced by the ripped up roots of trees thrown by the hurricane of '38. Has snow erased the contours?

Many times the signs prompt the skier to personalize his response, to go beyond the intellectual, to use all his senses:

Shhh

You're now well into the forest. Do you see any birds? Close your eyes and listen. Would wind whisper or rattle through these branches? Look at the sky. Are the trees thick enough to protect you in a storm?

Farther along the trail a comparison is requested and a decision called for. The skier feels the immediacy of his environment. No longer is he merely passing through:

Self Pruning

These trees are pruning themselves. Lack of sunlight causes lower branches to die and eventually fall off. Look for the sky. Listen for the wind. Would you camp here for the night or up in the northern hardwoods?

The signs are intended to reflect concern for the individual's well-being as well as the learning process:

Black Cherry Tree

Hope you made that dip O.K. It brought you down to a newer flood plain. This black cherry tree provides fruit for humans, birds and small mammals. The bark can be used medicinally and as a flavoring extract.

Where the trail crosses the river we labored long and hard to construct a sturdy log bridge, dubbed Johnsen's Jump. The nearby trail sign carries a powerful lesson in stream ecology:

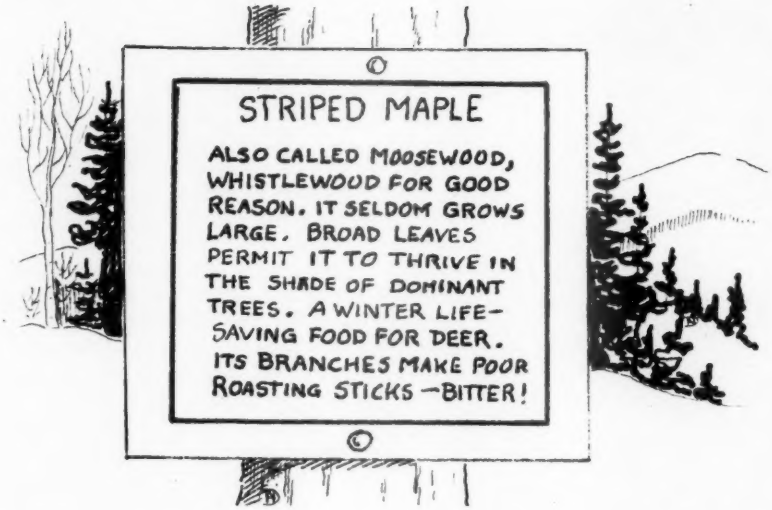
Johnsen's Jump

Johnsen's Jump spans Mad River, part of the Merrimack watershed, largest in N.H. Life in a mountain stream must adapt to a swift flowing environment. The bridge, tho' strong, is neither streamlined nor able to hold fast to stones and will go out with the ice this spring.

Sometimes a question with no clear answer strikes closest to truth:

Standing Soil

This yellow birch stub being broken down by small insects, fungi and microorganisms is returning essential minerals and nutrients to the soil to strengthen growing plants. It is but one


STRIPED MAPLE
ALSO CALLED MOOSEWOOD, WHISTLEWOOD FOR GOOD REASON. IT SELDOM GROWS LARGE. BROAD LEAVES PERMIT IT TO THRIVE IN THE SHADE OF DOMINANT TREES. A WINTER LIFE-SAVING FOOD FOR DEER. ITS BRANCHES MAKE POOR ROASTING STICKS —BITTER!

link in the great chain of life. Is birch veneer as beautiful?

Yet purely scientific information need not forego the dynamics of life:

Plant Growth Movement—Tropism
When young this black cherry was bent left by a falling tree. Its growth has been both a response to gravity (geotropism), for it wants to grow upward, and a struggle for light (phototropism), for it needs sun to live.

The trail's length, 1-1/2 miles, proves ideal for skiers. The signs, 46 in all and laboriously inscribed with an engraver on 3- by 5-inch laminated plastic plaques, take about 1 hour each to complete, but the results are worth the effort. Impervious to weather and easily visible against the snow-covered trees, they look attractive and professional. They are mounted on 6- by 7-inch boards bolted to posts along the trail. As snow accumulates, the signs can be rebolted higher on the posts. The environmental interpretations are spaced more frequently on the first half of the trail when skiers are freshest; as skiers' strength wanes, fewer signs demand their attention. In all cases messages are kept sufficiently brief to prevent pronounced shivering on cold days. Of course, a written pamphlet could have served as the guide for a numbered trail. This possibility was rejected because of the clumsiness of hands in mittens and the litter problem.

As for vandalism, there has been none at all. We chalk this up to the traditional gentility of ski tourers. Frost action has been the most destructive force, and in the future the wooden sign bases will be routed to receive the plastic plaques and thus prevent water from seeping between the two, freezing, and breaking the epoxy bond. We should have foreseen this:

Frost Crack
You saw a small poplar on the ski slope. This larger one has a black scar healing a frost crack. Water seeps in, freezes, expands and widens the split.

Dave Allan's assistance extended beyond the nature trail to the Environmental Center, where, at his suggestion, we prepared instructional displays for twig and bud identification and for wildlife tracks. A complete collection of stuffed birds and animals native to the Waterville Valley area was loaned us by Bob Chaffee of the Dartmouth College Museum and has proved very popular. Receiving the greatest response, however, has been a 4- by 8-foot painting by Boston's Florrie Everett of the fiercest snow flea in the state.

The winter's high point was the unification of ski touring lessons, winter camping techniques, and all of our environmental study procedures into a week-long course for a nearby college. The last night of the session found 20 students with their instructors camped in the White Mountains on a highland meadow far from the nearest road. Firelight played sunset on the snow:

You're on your own now—no signs. You'll see many trees you know, dens, woodpecker workings, flood plains, maybe even a tree burl. Stop occasionally to listen and search out more than any sign can tell. ♦

(continued from p. 11)
the loess belt in Tennessee, Mississippi, Arkansas, and Louisiana.

An attractive plant with long, fine stems that give it a spreading appearance, Spreading lespedeza provides a dense enough and high enough cover to suppress most undesirable plants. The new growth is bronze-colored, blending into the rich green of older oval-shaped leaflets.

Based on the tests made at the plant materials center and on problem conditions in several states, Spreading lespedeza was recently certified by the Georgia Crop Improvement Association. It was released in the spring of 1974 by the Soil Conservation Service and the University of Georgia Agricultural Experiment Stations.

Although Spreading lespedeza seed is not available from commercial sources at the present, certified seed will be available very soon. Seed production is good, with yields and methods of handling about the same as for sericea lespedeza, which in the past has been effectively used on many of the same problem areas as the newer plant.

Sericea lespedeza, however, is taller and has a coarse texture that does not provide the pleasing appearance desired for some locations.

Another advantage of Spreading lespedeza over sericea lespedeza for roadbanks is that it is more tolerant of mowing.

Spreading lespedeza is planted in the same manner and at the same rate as sericea lespedeza. Hydraulic seeding equipment can be used very effectively in planting the seed on steep slopes and in other problem situations. ♦

Wind Erosion Checked With Feedlot Waste

Besides increasing soil fertility, cattle feedlot waste may be a means of controlling wind erosion on cropland, according to a recent study by USDA's Agricultural Research Service (ARS).

ARS scientists have prepared reference graphs from their research for the Soil Conservation Service to use in determining the amount of feedlot waste needed to reduce wind erosion in various field situations. The amount of waste required varies with soil texture and roughness as well as the application method.

The ARS field plot studies, conducted in cooperation with the Kansas Agricultural Experiment Station at Manhattan, show that animal waste—which can be a water pollutant in the feedlot—is about as effective as anchored straw in restricting soil loss from highly erosive sandy soil.

Soil loss was reduced from about 4 tons per acre to less than a half ton where at least 30 tons (wet basis) of animal waste per acre were tandem-disked into the soil or where 15 tons were spread on the soil surface. This 88 percent reduction in soil loss—compared with unprotected plots—was on soil averaging 74 percent sand, 20 percent silt, and 6 percent clay.

The measurement was taken on the second day after application, following the use of a portable wind tunnel operating at a windspeed of 36 miles per hour to simulate wind erosion.

A second measurement in May, after the animal waste and straw had weathered over the winter, showed that at least 15 tons of animal waste per acre, surface applied, or a half ton of anchored straw reduced soil loss by 90 percent. Sixty tons of tilled-in animal waste were needed for equal protection.

The researchers noted, however, that more than double the usual over-winter precipitation at the test site caused soil crusting and extremely low susceptibility to wind erosion in May.

They reported several advantages to tilling-in animal waste to restrict wind erosion. These include minimizing the likelihood of surface runoff carrying high concentrations of pollutants and retaining more of the fertilizer value of the waste because less of the nitrogen is lost into the air. Also, tilling-in provides an outlet for at least twice the amount of animal waste as surface application. ♦

Natural Resources Is Program Theme For NSA for 1977

The National Secretaries Association (NSA) has selected natural resources as its 1977 Program of the Year, and is working with the Soil Conservation Service and the National Association of Conservation Districts regarding information on conservation of natural resources.

The educational "Program of the Year" is developed 2 years ahead of presentation to members. NSA has more than 750 chapters and 33,000 members in the United States and Canada. In addition, it sponsors the Future Secretaries Association, which has more than 450 chapters and 11,300 members. ♦

An interdisciplinary team tells of planning vegetative treatment prior to stream channel construction to minimize disturbance of natural vegetation and to select multipurpose plantings for the disturbed areas.

An aerial view shows a channel constructed leaving natural vegetation.

Vegetating Stream Channels—A Multipurpose Approach

by Arthur L. Bell, Edward D. Holcombe, and Vernon H. Hicks
Conservation agronomist-Watersheds, field specialist-Woodland, and biologist, SCS, Temple, Texas

The vegetative treatment of stream channels that have been modified with Soil Conservation Service help begins during the planning stage.

An interdisciplinary team studies the area to locate any natural areas that can be left undisturbed during channel work.

Then plans are made to disturb natural vegetation as little as possible during and after construction of the channel, while meeting the objective of the channel work.

SCS aids local groups in channel modification as a flood prevention and watershed protection measure where other land treatment or structural measures are not feasible or cannot do the job alone. Basic aim is to restore the ability of the channel to hold water and move it safely downstream.

During the planning stage, SCS develops a detailed vegetative plan for all sections of the channel. The interdisciplinary team's report serves as a guide to the planning party in alignment of the channel and in location of sites for deposition of spoil. Insofar as economically and

environmentally feasible, the maximum amount of natural vegetation is left right up to the edge of the channel itself.

One method to minimize disturbance of natural vegetation is to plan alignment and size of the channel while leaving natural vegetation on one side. Excavation is done from the other side with the spoil deposited and spread on that side.

As the work progresses, excavation is done from alternate sides, thus staggering the spoil and the leaving of natural areas. This creates a more esthetic appearance by breaking the monotony of continuous spoil on one side. It also gives landowners on both sides of the channel access to undisturbed areas of woody vegetation.

The vegetative plan is designed to accomplish several objectives. Erosion control of disturbed areas is the primary concern. Consideration is also given to vegetation useful as food and cover for wildlife as well as useful for the maintenance or improvement of the esthetic values of the area. Therefore, a combination of grasses and woody vegetation is planned for multipurpose use.

An example of a channel cross section is shown in the accompanying diagram. The natural vegetation has been left on one side. All excavation has been done from the other side and the spoil has been shaped. The vegetative plan gives consideration to all areas which have been disturbed. The entire section is divided into areas which may need different vegetative treatments to meet the objectives of the plan. These areas are delineated on the cross section.

Area 1 includes the channel bottom. Species from the Soil Conservation Service's plant materials center will be established and evaluated at locations within this area where stablization is needed. Such species as prairie cordgrass, common reedgrass, and switchgrass could be used. A detailed plan will be developed before such plant materials are used.

Area 2 includes the channel cut slopes and the front side of the spoil. In this example, no berm is left between the top of the cut slope and the front toe of the spoil. The primary objective of vegetation in this area is erosion control. A grass such as Selection-3 bermudagrass will be sprigged here. Establishment by sprigging is more reliable because the danger of losing all vegetation during flooding is reduced. The sprigs also become established more quickly, thus assuring earlier cover. Grasses such as Kleingrass-75 and/or switchgrass will be seeded above the hydraulic gradient for wildlife food. If space permits,

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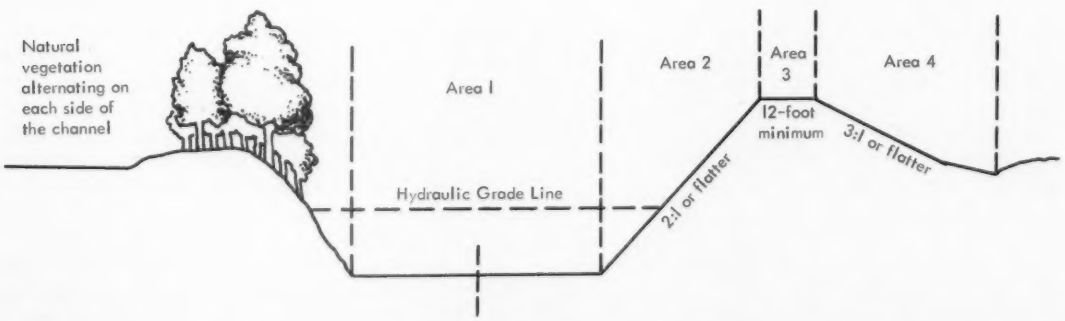
PLANNED PERMANENT VEGETATION ON A STREAM CHANNEL. This cross section illustrates plant materials that might be planted on a channel. **Area 1—the stream bottom.** Species from the plant materials center are evaluated and established at locations where stabilization is needed. **Area 2—the channel cut slopes and front side of the spoil.** Selection-3 bermudagrass overseeded with Kleingrass-75 and three rows of dewberries. Kleingrass-75 and dewberries have both wildlife food and cover value. **Area 3—the crown of the spoil after it is spread.** Selection-3 bermudagrass overseeded with Kleingrass-75 or bahiagrass. **Area 4—the back slope.** Selected woody plants and grass mixture selected for erosion control, esthetic value, and as wildlife food and cover.



Natural vegetation remains on either side of this channel constructed in an urban area.

three rows of vines such as dewberries may also be planted for food and cover for wildlife.

Area 3 is the crown of the spoil after it is spread. This area will be used for maintenance access since no berm is planted in this example. Selection-3 bermudagrass will be sprigged and grasses such as Kleingrass-75 will be seeded to provide multipurpose cover.

Area 4 is the back slope of the spread spoil plus any disturbed area within the permanent easement. The grass mixture here will be compatible with the land use of adjacent fields. For example, bermudagrass is not usually sprigged adjacent to a cultivated field. These sections are seeded to grasses such as Kleingrass, switchgrass, indiangrass, or bluestem. This enhances the wildlife value while still providing adequate cover. Selected woody plants will be planted in clusters—or motts—to provide wildlife food and cover. These plants will also improve the esthetic value of the channel right-of-way. The woody plants include trees such as pecan, walnut, mulberry, oaks, and crabapple. Shrubs may include Russian and autumn olive and bush honeysuckle. Some vines such as dewberry, grape, and honeysuckle may also be included in the motts.

The motts of woody vegetation would be spaced about a quarter of a mile apart on the spoil. Each would be fenced to prevent grazing by domestic livestock while still providing access to wildlife. Motts would also be placed adjacent to any road crossing the channel.

The permanent easement may be fenced to control grazing in sections where livestock are present. Other sections are left without fencing if the land use does not include livestock in the foreseeable future.

The vegetative plan establishes time limits for the establishment of permanent vegetative cover. If the construction of the channel is completed 2 months or more before the time that permanent vegetation can be established, temporary cover is used to control erosion. This is followed by site preparation and establishment of permanent cover during the applicable time of the year. Cover is quickly obtained regardless of when construction is completed.

Plant materials evaluation continues and trials are continuously underway on watershed works of improvement. This work includes the use of both native and introduced species of plants. The evaluations include erosion control, esthetic values, and wildlife food and cover values. Thus, multipurpose vegetation is assured on all disturbed areas after construction. ♦

Minnesota State Hospital Boasts 'Community' Outdoor Activities Area

by Kent A. Alverson
Head, Information Unit, TSC, SCS, Lincoln, Nebraska

What was once a farm at Minnesota State Hospital at St. Peter is now an outdoor learning and recreation area, used year-round by hospital patients, local students, teachers, and other individuals and groups.

Begun only 5 years ago when agriculture was phased out of the hospital's program, the 115-acre area includes a pond large enough for boating and fishing, nature trails, and woodland and wildlife plantings that attract deer, waterfowl, and other wildlife.

Prime movers in converting the farm into an outdoor learning project were Tom Swanson, program supervisor for the patients, and Duane (Dewey) Goerend, district conservationist for the Soil Conservation Service.

"When I was given the job of developing this land, the first person I contacted was Dewey," said Swanson. "He came up with lots of great ideas—such as the fish pond, grassland terraces, and nature trails. The state's Department of Forestry, the wildlife manager, and the Department of Fisheries were all very cooperative."

The outdoor activities area has a complete land use and conservation plan prepared in cooperation with the Nicollet Soil and Water Conservation District. Most of the work scheduled in the 5-year plan was carried out in 4 years with federal and hospital funding.

Almost all of the work in the beginning, including the roads, was done by hand by recreation staff and patients. Later, they were joined by the Teen Corps, a group of students who volunteer to work on camp projects. Private donations have included the headquarters and classroom building.

The hospital's three institutions each use the day camp and nature areas differently.

The Minnesota Valley Adaption Center for the mentally retarded, with 350 persons enrolled, has highly structured activities—such as crafts or boating or fishing—with precise scheduling.

The St. Peter state hospital for the mentally ill and chemically dependent takes care of nearly 300 persons and has a more casual schedule—such as crafts in the morning and a choice of pursuits or just relaxing in the afternoon.

The Minnesota Security Hospital, with about 100 men who are considered dangerously insane, uses the area as a leisure-time camp. All patients are closely supervised by staff personnel.

Last year, patients and residents on the hospital campus spent 22,000 hours in day camping. Outside groups such as the YMCA, Gustavus Adolphus College, and 4-H Clubs spent another 12,000 hours at the day camp. For 4 years Mankato State College has used the site for teachers' workshops, attended annually by 60 or more teachers.

A big bonus from the recreation and study area has been improved public relations, according to James Littig, assistant administrator of the hospital.

"People don't usually come to visit the hospital, but they will visit the recreation area.

"We thus get a mingling of community residents and patients. It's a revelation to many that our patients are real people with a problem. It brings the institution and the city closer together." ♦

Both patients and community residents use the outdoor learning and recreation area at Minnesota State Hospital at St. Peter.

Del Sanford, biologist with the Oregon Wildlife Commission, checks a plant trial in the Sauvie Island Wildlife Management Area.

Cooperative Effort Results in Better Plants for Wildlife

by Stanley L. Swanson
Manager, Corvallis Plant Materials Center, SCS, Corvallis, Oregon

One of the primary aims of the Soil Conservation Service is to help the owners of the nation's private lands improve habitat for wildlife. Since the SCS is always on the lookout for plants for all conservation uses, it assembles, tests, and guides into commercial channels plants that offer food and cover for wild animals.

It was a natural consequence, therefore, that SCS began working with the Oregon Wildlife Commission, which in its efforts to improve conditions for wildlife has many of the same concerns. For 12 years the two agencies have used a broad but concisely stated formal agreement as a basis for their cooperation. An objective, according to the agreement, is to provide more nearly adequate feed sources for big game, waterfowl, upland game birds, and songbirds. Erosion control and soil improvement are additional objectives of the cooperative effort.

This cooperation helped lead to the release, in the spring of 1971, of 'Marshfield' big trefoil to commercial seed producers. Following favorable early results in Agricultural Research Service tests, the superiority of Marshfield was shown during extensive testing at the SCS Corvallis Plant Materials Center and at the Wildlife Commission Sauvie Island Wildlife Management Area north of Portland.

In the Sauvie Island work, Marshfield big trefoil was compared with three other trefoils. All were seeded with meadow foxtail. These grass-legume plantings served as pasture for both livestock and migrating geese and widgeon. Marshfield big trefoil and meadow foxtail proved to be an excellent combination because of their tolerance to wet, acid soils and their high palatability. In combination with various grasses, Marshfield big trefoil is also being tested in coast range plantings used by deer and elk, and has wildlife value where seeded in the deflation plains formed along the landward side of coastal foredunes.

Transmission line construction through the coastal mountains is offering opportunities to test grasses and legumes for big game use as well as for erosion control. In the lower rainfall zones, 'Cascade' birdsfoot trefoil and orchardgrass are among the top performers. Big trefoil is seeded instead of birdsfoot trefoil where annual rainfall exceeds 60 inches. Trial seedings have led to quality plantings for game.

Oregon Wildlife Commission and SCS personnel have also developed cultural and management methods for establishing and maintaining stands of many plants they have tested. Seedbed preparation on fine textured soils has been a major obstacle to successful seedings, particularly where wetness is a problem. Use of a tractor-drawn rototiller has overcome this problem in tests at the Corvallis Plant Materials Center. Wildlife Commission personnel have done an ex-

At the SCS Corvallis Plant Materials Center, seed is harvested from 20-foot observation rows for yield data.

ceptional job of using "Atrazine," a selective herbicide, for establishing essentially weed-free stands of corn, sudangrass, and proso millet. Other management "tools" have included fertilizing, grazing, annual tillage, and mowing.

Many benefits have been gained for western Oregon from the work at plant materials centers in adjoining states. These centers, located at Pullman, Washington; Aberdeen, Idaho; and Lockeford, California, are also working closely with their respective state wildlife agencies. All three centers have shared plants they have selected, as well as information on culture and management.

Testing of plants for wildlife is a slow process, requiring a wide range of abilities. But results to date have been particularly encouraging because biologists and agronomists in federal and state agencies have worked together to systematically set priorities, plan and conduct testing, and evaluate results. ♦

Recon . . .

A real conservative 2 million gallons. The state may have more oil than you can shake a derrick at, but even Texas can't afford to waste fuel. Consequently, Texas farmers are real happy about the 2 million gallons of tractor fuel they saved this year by using minimum tillage. The new tillage method, which reduces the number of passes a farmer has to make over a field, is reported on 367,000 Lone Star acres. Although that's the reported figure, SCS in Texas projects the actual amount of minimum tillage in the state to cover up to 750,000 acres this year. But even at the most conservative possible figures, the Texans are 2 million gallons to the better, making minimum tillage a real WINner.

Habitat critical for rare warbler. As the mature cedar goes, so goes the golden-cheeked warbler. That's the conclusion reached in a recent Texas Parks and Wildlife Department study of the rare little bird which nests in mature juniper or cedar communities in central Texas. The department and the Soil Conservation Service are disseminating information on how landowners can preserve habitat for the birds. The department's nongame program received additional funding from the legislature to help maintain the warbler's habitat. Nevertheless, authorities report, habitat is being destroyed through brush clearing and subdividing throughout the golden-cheek's range.

Home on the unusual range. In addition to assistance to ranchers and other conventional livestock producers, Florida conservation districts are assisting in the planning of new livestock operations for "nonconventional" producers. These include such unlikely cattlemen as Walt Disney World, the Avon Park Bombing Range, several large paper companies, and several land development companies. Emphasis is placed on multiple land use. In many instances, cattle are being used to control and manipulate excessive vegetative growth in order to improve wildlife habitat.

Notice: Bargain - hunting antique car enthusiasts who like to look for junked autos on back roads are advised to forget about the Five Rivers Resource Conservation and Development Project area of Tennessee—the junk cars are gone. The RC&D Project in a cooperative venture with the

U.S. Army at Fort Campbell and the Tennessee Valley Authority, has collected and disposed of thousands of the clunkers.

Conservation weathers bad weather. Indiana had one of those seasons farmers dread this year. It was so wet this spring that planting was often delayed. Then a bout of dry weather in July reduced yields still further. According to SCS State Conservationist Cletus Gillman, however, some farmers managed to mitigate the weather's impact through mulch tillage and no-till planting. The shorter time required for planting allowed many farmers to complete the job before the spring rainy season began. The fields covered by mulch residue stood the drought conditions better than crops on plowed seedbeds. Gillman reports, "These early planted crops display the greatest potential for near normal yields."

Navy soil survey completed. SCS finished a special soil survey of the Guantanamo Bay area of Cuba in 1974. The survey, an aid to the U.S. Navy in development of forestry, fish and wildlife, outdoor recreation, and other resources, put special emphasis on recommendations for fresh water impoundments and sources of road fill materials. Guantanamo Bay is the naval base administered by the United States under a lease from Cuba.

GRAND LARSeny. SCS has assigned a soil scientist to work fulltime with Purdue University on some grand LARSeny. LARS —the Laboratory for Applications of Remote Sensing—is working on a major NASA-funded program to promote the use of remote sensing. So far, eight projects have been initiated which use remote sensing technology as an aid in the management of the natural resources of Indiana.

New York loses a ton of soil in under 2 seconds—OOPS! there goes another one! The Erosion and Sediment Survey begun by SCS in New York State 3 years ago has been completed, with some staggering findings. The published report indicates that the state is losing soil at the rate of 45 million tons a year: almost 40 tons a minute, more than half a ton a second. Construction sites have the highest rate of sheet erosion loss, losing more than 30 tons of soil per acre annually.

Soil surveys

Arkansas

Crittenden County. By James L. Gray and Dick V. Ferguson. 1974. Soil Conservation Service in cooperation with Arkansas Agricultural Experiment Station. 49 pp., illus.; maps.

California

Eastern Santa Clara Area. By Wesley C. Lindsey. 1974. Soil Conservation Service in cooperation with University of California Agricultural Experiment Station. 90 pp., illus.; maps.

Mariposa County Area. By Charles S. Butler and Griffith S. Jones. 1974. Soil Conservation Service in cooperation with University of California Agricultural Experiment Station. 68 pp., illus.; maps.

Palo Verde Area. By Noram E. Elam. 1974. Soil Conservation Service in cooperation with University of California Agricultural Experiment Station. 37 pp., illus.; maps.

Shasta County Area. By T. A. Klaseen and D. K. Ellison. 1974. Soil Conservation Service and Forest Service in cooperation with University of California Agricultural Experiment Station. 160 pp., illus.; maps.

Indiana

Clark and Floyd Counties. By Allan K. Nickell. 1974. Soil Conservation Service in cooperation with Purdue University Agricultural Experiment Station. 100 pp., illus.; maps.

Meetings

Maryland

Garrett County. By Kenneth M. Stone and Earle D. Matthews. 1974. Soil Conservation Service in cooperation with Maryland Agricultural Experiment Station. 83 pp., illus.; maps.

Oklahoma

Tillman County. By Otho W. Lamar and Clifford E. Rhodes. 1974. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station. 64 pp., illus.; maps.

South Carolina

Florence and Sumter Counties. By J. J. Pitts. 1974. Soil Conservation Service in cooperation with South Carolina Agricultural Experiment Station. 111 pp., illus.; maps.

Texas

Coke County. By Lloyd J. Barnhill. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 49 pp., illus.; maps.

Hale County. By Earl R. Blakely and William M. Koos. 1974. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 54 pp., illus.; maps.

Wisconsin

Brown County. By Ernest G. Link, Charles F. Leonard, Howard E. Lorenz, Wayne D. Barndt, and Steven L. Elmer. 1974. Soil Conservation Service in cooperation with Wisconsin Agricultural Experiment station. 119 pp., illus.; maps.

January

19–22 *National Wool Growers Association and Lamb Feeders Association Joint Convention, San Antonio, Tex.*

27–31 *American Association for the Advancement of Science, New York, N.Y.*

28–30 *American National Cattlemen's Association, Las Vegas, Nev.*

February

2–6 *National Association of Conservation Districts Convention, Denver, Colo.*

6–8 *American Camping Association, New England Convention, Boston, Mass.*

6–8 *Catfish Farmers of America Convention, Little Rock, Ark.*

9–14 *Society For Range Management, Mexico City, Mexico*

10–14 *Annual Eastern Snow Conference, Manchester, N.H.*

19–22 *American Camping Association Mid-Atlantic/Southern Regions Convention, Washington, D.C.*

21–24 *American Association of School Administrators, Dallas, Tex.*

23–26 *Land Improvement Contractors of America, San Antonio, Tex.*

23–26 *Sprinkler Irrigation Association Technical Conference, Atlanta, Ga.*

25–26 *American Forest Institute, Atlanta, Ga.*

28–Mar. 6 *Associated General Contractors Convention, Honolulu, Hawaii*

March

5–8 *American Camping Association Mid-American Region Convention, Milwaukee, Wisc.*

9–14 *American Society of Photogrammetry, Washington, D.C.*

14–16 *National Wildlife Federation, Denver, Colo.*

15–19 *Association for Supervision and Curriculum Development, New Orleans, La.*

16–20 *American Concrete Pipe Association, Boca Raton, Fla.*

24–28 *Seventh Recreation Management Institute, College Station, Tex.*

April

2–4 *Thirteenth Annual Symposium on Engineering Geology and Soils Engineering, Moscow, Idaho*

6–11 *American Chemical Society, Philadelphia, Pa.*

9–12 *American Camping Association Western Region Convention, Pacific Grove, Calif.*

13–16 *National Water Safety Congress, Milwaukee, Wisc.*

17–22 *National Audubon Society, New Orleans, La.*

20–23 *Association of American Geographers, Milwaukee, Wisc.*

21–24 *International Symposium on Livestock Wastes, Urbana- Champaign, Ill.*

21–25 *American Geophysical Union, Washington, D.C.*

21–25 *Annual Western Snow Conference, San Diego, Calif.*

27–May 1 *Garden Club of America, Washington, D.C.*

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